

Patent Claims

1. An inhaler for the administration of a pharmaceutical composition comprising a mouthpiece, an air channel opening into the mouthpiece and optionally a chamber which may optionally be provided with an air inlet channel or an air opening, wherein the inhaler is capable of receiving a) a capsule with the composition, b) a blister pack with the composition, or c) a conveyor belt holding the composition, wherein at least part of the inner surface of the mouthpiece and/or of the air channel and/or optionally the chamber contains elevations and/or depressions with a height/depth of from 0.1 to 100 microns.
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2. The inhaler according to claim 1 wherein at least either the inner surface of the mouthpiece, the air channel and/or the chamber is produced by microtechnology or nanotechnology over at least 20% of its surface.
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3. The inhaler according to claim 1 wherein the elevations and depressions are separated by spacings in the range from 0.1 to 200 microns.
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4. The inhaler according to claim 1 wherein the inner surfaces are formed by hydrophobic materials selected from one or more of glass, ceramics, metals and plastics, wherein the plastics are further selected from one or more of polyethylene, polypropylene, polycarbonate, polyacrylate, polyester and silanes.
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5. The inhaler according to claim 1 wherein the inner surfaces are formed by processes comprising subtractive or additive treatment selected from stamping, etching, laser ablation, galvanic machining, adhesively attaching a structured film, adhesion of a powder, spraying with suspensions, and depositing sublimates.
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6. The inhaler according to claim 1 wherein the inhaler is a Bernoulli inhaler.

7. The inhaler according to claim 6 wherein the inhaler comprises a capsule chamber which is connected to the air channel opening in the mouthpiece.
8. The inhaler according to claim 7 wherein the capsule chamber has a diameter 1.1 to 5 2.5 times the capsule diameter and a length 1.02 to 2 times the length of the capsule.
9. The inhaler according to claim 7 wherein the inhaler has a cutting device which is fitted with at least two sharp spikes and/or cutters, the spikes and/or cutters being capable of being inserted through openings into the capsule chamber(s).
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10. The inhaler according to claim 6 wherein the inhaler comprises
 - a) a cup-shaped lower part open at the top,
 - b) a plate which covers the opening of the lower part and perpendicularly to which is formed the capsule chamber, a button movable counter to a spring on the capsule 15 chamber, comprising two sharp spikes or cutters for opening the capsule,
 - c) an upper part with the mouthpiece and the air channel which connects the mouthpiece to the capsule chamber so as to be able to convey a powder or liquid or aerosol, and
 - d) a lid, the elements a), b) c) and d) being joined together by a common hinge element such that they can be moved back and forth relative to one another.
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11. A capsule for use with an inhaler wherein the inner and/or outer surface of the capsule is structured by elevations and/or depressions with a height/depth of 0.1 to 100 microns.
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12. A blister pack adapted for use with an inhaler wherein the inner and/or outer surface of the capsule retained in each blister comprises elevations and/or depressions with a height/depth of 0.1 to 100 microns.

13. A membrane for conveying a metered amount of active substance for an inhaler wherein the inner and/or outer surface of the membrane comprises elevations and/or depressions with a height/depth of 0.1 to 100 microns.
- 5 14. The blister pack according to claim 12 wherein the inner surface and/or outer surface of the capsule is produced by microtechnology or nanotechnology.
- 10 15. The capsule according claim 11 wherein the inner surface and/or outer surface is produced by microtechnology or nanotechnology.
16. The membrane according to claim 13 wherein the inner surface and/or outer surface is produced by microtechnology or nanotechnology.
- 15 17. The blister pack according to claim 14 wherein the surface of the capsule is produced by microtechnology or nanotechnology over at least 20% of its surface.
18. The blister pack according to claim 17 wherein the spacings between the elevations and depressions of the surface of the capsule are in the range from 0.1 to 200 microns.
- 20 19. The capsule according to claim 15 wherein the surface is produced by microtechnology or nanotechnology over at least 20% of its surface.
- 25 20. The capsule according to claim 19 wherein the spacings between the elevations and depressions of the surface are in the range of from 0.1 to 200 microns.
21. The membrane according to claim 16 wherein the surface is produced by microtechnology or nanotechnology over at least 20% of its surface.
- 30 22. The membrane according to claim 21 wherein the spacings between the elevations and depressions on the surface are in the range of from 0.1 to 200 microns.